

What is claimed is:

Subject
1. A display device in which the display state is prescribed by the distribution state of particles, comprising a drive circuit for applying a first voltage for changing the distribution state of the particles, and for applying a second voltage for maintaining the distribution state of said particles.

2. A display device according to claim 1, wherein said particles are contained in a microcapsule together with liquid for dispersing said particles.

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3. A display device according to claim 1 or claim 2, further comprising a plurality of scanning electrodes and data electrodes for applying voltage to said particles in pixel units.

4. A display device according to claim 1 or claim 2, further comprising a plurality of scanning lines and data lines for applying voltage independently in pixel units to said particles.

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5. A display device according to claim 4, wherein a

6. A display device according to claim 5, wherein said switching element comprises a semiconductor element.

8. A display device according to claim 5, wherein said switching element is a two-terminal nonlinear element.

9. A display device comprising a data writing circuit which moves charged particles and writes data by filling liquid having charged particles dispersed therein between an active matrix substrate, in which switching elements and pixel electrodes disposed in correspondence with said switching elements are arranged in an array, and an opposed substrate, and applying voltage for each pixel between said active matrix substrate and said opposed substrate; wherein said display device further comprises a refresh circuit for refreshing at prescribed intervals the data of each pixel written pursuant to said data writing circuit.

10. A display device comprising a data writing circuit which moves charged particles and writes data by disposing a microcapsule filled with liquid having charged particles dispersed therein between an active matrix substrate, in which switching elements and pixel electrodes disposed in correspondence with said switching elements are arranged in an array, and an opposed substrate, and applying voltage for each pixel between said active matrix substrate and said opposed substrate; wherein said display device further comprises a refresh circuit for refreshing at prescribed intervals the data of each pixel written pursuant to said data writing circuit.

11. A display device comprising a data writing circuit which moves charged particles and writes data by filling liquid having charged particles dispersed therein between an active matrix substrate, in which switching elements and pixel electrodes disposed in correspondence with said switching elements are arranged in an array, and an opposed substrate, and applying voltage for each pixel between said active matrix substrate and said opposed substrate; wherein said data writing circuit comprises a switch for turning said data writing on/off and structured of said switching elements and

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a driver for controlling said switching elements, and said driver is structured so as to be driven with a decoder method.

12. A display device comprising a data writing circuit which moves charged particles and writes data by disposing a microcapsule filled with liquid having charged particles dispersed therein between an active matrix substrate, in which switching elements and pixel electrodes disposed in correspondence with said switching elements are arranged in an array, and an opposed substrate, and applying voltage for each pixel between said active matrix substrate and said opposed substrate; wherein said data writing circuit comprises a switch for turning said data writing on/off and structured of said switching elements and a driver for controlling said switching elements, and said driver is structured so as to be driven with a decoder method.

13. A display device according to claim 11 or claim 12, wherein said driver is a data driver to be connected to the data line of the pixel unit of said switching element and a scanner driver to be connected to the scan line of the pixel unit thereof.

14. A display device according to claim 11 or claim 12,

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wherein said data writing is conducted by only selecting and rewriting pixels for rewriting data.

15. A display device comprising a data writing circuit which moves charged particles and writes data by filling liquid having charged particles dispersed therein between an active matrix substrate, in which switching elements and pixel electrodes disposed in correspondence with said switching elements are arranged in an array, and an opposed substrate, and applying voltage for each pixel between said active matrix substrate and said opposed substrate; wherein a single pixel is structured of a plurality of sub pixels, and gradation is controlled by pulse-surface-area modulation.

16. A display device comprising a data writing circuit which moves charged particles and writes data by disposing a microcapsule filled with liquid having charged particles dispersed therein between an active matrix substrate, in which switching elements and pixel electrodes disposed in correspondence with said switching elements are arranged in an array, and an opposed substrate, and applying voltage for each pixel between said active matrix substrate and said opposed substrate; wherein a single pixel is structured of a plurality of sub pixels, and gradation is controlled by

pulse-surface-area modulation.

17. A display device comprising a data writing circuit which moves charged particles and writes data by filling liquid having charged particles dispersed therein between an active matrix substrate, in which switching elements and pixel electrodes disposed in correspondence with said switching elements are arranged in an array, and an opposed substrate, and applying voltage for each pixel between said active matrix substrate and said opposed substrate; wherein said charged particles are formed of a plurality of types of charged particles with differing quantities of electric charge.

18. A display device comprising a data writing circuit which moves charged particles and writes data by disposing a microcapsule filled with liquid having charged particles dispersed therein between an active matrix substrate, in which switching elements and pixel electrodes disposed in correspondence with said switching elements are arranged in an array, and an opposed substrate, and applying voltage for each pixel between said active matrix substrate and said opposed substrate; wherein said charged particles are formed of a plurality of types of charged particles with differing quantities of electric charge.

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19. A display device according to claim 17 or claim 18, further comprising gradient setting means for controlling the gradient by controlling one or both of the value/time of the voltage to be applied with said data writing circuit.

20. A display device according to any one of claims 9 to 19, wherein said switching element is a low-temperature poly-Si TFT.

21. A display device according to any one of claims 9 to 20, wherein said switching element is of a structure wherein the channel portion is at least formed of an organic film.

22. A display device according to claim 9 or claim 10, wherein said refresh circuit comprises a circuit for reapplying voltage based on the data of each of said pixels in prescribed intervals in order to substantially maintain the distribution state of the particles which moved pursuant to the voltage applied based on the data of each of said pixels.

23. A recording medium in which the display state is prescribed by the distribution state of particles, and structured so as to be capable of applying a first voltage for

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changing the distribution state of the particles, and applying a second voltage for maintaining the distribution state of said particles.

24. A recording medium according to claim 23 formed by filling liquid having charged particles dispersed therein between an active matrix substrate, in which switching elements and pixel electrodes disposed in correspondence with said switching elements are arranged in an array, and an opposed substrate; structured to be capable of writing data by moving charged particles by applying voltage for each pixel between said active matrix substrate and said opposed substrate; and structured to be capable of refreshing at prescribed intervals the data of each pixel written pursuant to said second voltage applied by said drive circuit.

25. A recording medium according to claim 23 or claim 24, wherein said particles are contained in a microcapsule together with liquid for dispersing said particles.

26. A recording medium according any one of claims 23 to 25, wherein said single pixel is structured of a plurality of sub pixels, and gradation is controlled by pulse-surface-area modulation.

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27. A recording medium according to any one of claims 23 to 26, wherein said particles are formed of a plurality of types of charged particles with differing quantities of electric charge.

28. A recording device for recording on to a sheet-shaped recording medium, comprising: a plurality of roller pairs for feeding and securing said sheet-shaped recording medium; and a signal supply source for supplying rewriting signals to said sheet-shaped recording medium.

29. A recording device for recording on to a sheet-shaped recording medium, comprising: a plurality of roller pairs for feeding and securing said sheet-shaped recording medium; a controller; and a terminal unit to be electrically connected to said controller; wherein said terminal unit is provided at a position so as to be connectable with said sheet-shaped recording medium.